careers in

LOGISTICS

Ship Engineers

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Job Overview

Ship Engineers play an important role in moving passengers and cargo around the globe. They operate, maintain, and repair propulsion engines, boilers, generators, pumps, and other machinery. They regulate the engines to control the speed of the ship and use hand or power tools to repair machinery. Assistant Engineers stand periodic watches, overseeing the safe operation of engines and machinery. They work on many types of vessels on oceans and other waterways, as well as in harbors.

Merchant marine vessels usually have four engineering officers: Chief Engineer and a First, Second, and Third Assistant Engineer. The size and service of the ship determines the number of crewmembers for a particular voyage. Smaller ships may have only one Engineer, while some may not have an Engineer at all.

Ship Engineers may also be called Marine Engineers, Deck Engineers, or Operating Engineers.

Typical Tasks

- Start engines to propel ships, and regulate engines and power transmissions to control speeds of ships, according to directions from captains or bridge computers.
- Monitor and test operations of engines and other equipment so that malfunctions and their causes can be identified.
- Monitor engine, machinery, and equipment indicators when vessels are underway, and report abnormalities to appropriate shipboard staff.
- Perform general marine vessel maintenance and repair work such as repairing leaks, finishing interiors, refueling, and maintaining decks.
- Maintain and repair engines, electric motors, pumps, winches and other mechanical and electrical equipment, or assist other crew members with maintenance and repair duties.
- Maintain electrical power, heating, ventilation, refrigeration, water, and sewerage systems.
- Fabricate engine replacement parts such as valves, stay rods, and bolts, using metalworking machinery.
- Install engine controls, propeller shafts, and propellers.

*Detailed descriptions of this occupation may be found in the Occupational Information Network (O*NET) at online.onetcenter.org.*

Ship Engineers

Important Skills, Knowledge, and Abilities

- Operation and Control — Controlling operations of equipment or systems.
- Operation Monitoring — Watching gauges, dials, or other indicators to make sure a machine is working properly.
- Repairing — Repairing machines or systems using the needed tools.
- Equipment Maintenance — Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
- Writing — Communicating effectively in writing as appropriate for the needs of the audience.
- Coordination — Adjusting actions in relation to others' actions.
- Speaking — Talking to others to convey information effectively.
- Troubleshooting — Determining causes of operating errors and deciding what to do about it.
- Mechanical — Knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
- Control Precision — The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.

Work Environment

Ship Engineers spend extended periods at sea and work in all weather conditions. Ship life is much more pleasant than in the past with air-conditioning and comfortable living quarters. Modern communications like e-mail keep Engineers in touch with their families during long voyages.

Potential hazards associated with working on a ship include having to abandon the ship in an emergency, falling overboard, and working with machinery, heavy loads, and dangerous cargo. Safety has improved due to modern safety management procedures, advanced emergency communications, and effective international rescue systems. Implementation of international regulations has standardized and raised shipping standards concerning safety, training, and working conditions. This will make U.S. ships more competitive with those from other countries.

Ship Engineers may work seven days a week especially on long voyages. They usually stand watch for 4 hours and are off for 8 hours. Workers on rivers, canals, and in harbors are likely to work year-round. Some work 8- or 12-hour shifts and go home every day. Others may work for a week or month and then have an extended period off. Their shifts are usually 6 or 12 hours and then they are off for 6 or 12 hours.

Many Ship Engineers are unionized and may belong to one of the following unions: International Organization of Masters, Mates, and Pilots, the Seafarers' International Union of North America, or the Marine Engineers' Beneficial Association.

Ship Engineers

California's Job Outlook and Wages

The California Outlook and Wage table below represents the occupation across all industries.

Standard Occupational Classification	Estimated Number of Workers 2004	Estimated Number of Workers 2014	Average Annual Openings	2006 Wage Range (per hour)
Ship Engineers				
53-5031	1,200	1,500	80	$20.64 to $36.58

Wages do not reflect self-employment.
***Average annual openings** include new jobs plus net replacements.*
Source: www.labormarketinfo.edd.ca.gov, Employment Projections by Occupation and OES Employment & Wages by Occupation, Labor Market Information Division, Employment Development Department.

Trends

Although this occupation is small, employment for Ship Engineers is expected to grow much faster than average when compared with all other occupations. The need to replace workers who leave for other kinds of jobs or retirement is expected to create 500 job openings between 2004 and 2014.

Increases in tourism and shipping traffic are expected to boost employment around port cities. Ships that travel between U.S. ports are required by law to be U.S.-flagged vessels. Several new cruise ships traveling to and around the Hawaiian Islands will be built and staffed, creating more opportunities for Ship Engineers. Employment in deep-sea shipping is expected to stabilize in future years.

Training/Requirements/Apprenticeships

There are two ways to qualify for a Deck or Engineering Officer's license. Applicants must:

- accumulate sea time and meet regulatory requirements, or
- graduate from the U.S. Merchant Marine Academy or one of the six State maritime academies.

In both cases, applicants must pass a written examination. Federal regulations also require that an applicant pass a physical examination, a drug screening, and a National Driver Register Check before being considered.

Education

The only U.S. Merchant Marine Academy is located in New York. The California Maritime Academy (Cal Maritime), located in Vallejo, is the only degree-granting maritime academy on the West Coast.

The academies offer a four-year academic program leading to a bachelor of science degree, a license (issued only by the Coast Guard) as a Third Assistant Engineer (Engineering Officer), and, if the person is qualified, a commission as ensign in the U.S. Navy Reserve, Merchant Marine Reserve, or Coast Guard Reserve.

Recommended High School Course Work

High school students interested in this type of work should take coursework in mathematics, science, electronics, computer technology, machine shop, and auto shop.

Ship Engineers

Experience

Although it is difficult to pass the written exam without substantial formal schooling or independent study, those who possess sea service appropriate to the license for which they are applying can be licensed without formal training. Since Ship Engineers may work six or fewer months a year, it can take five to eight years to accumulate the necessary experience.

Where Do I Find the Job?

Ship Engineers usually gain employment through union hiring halls typically found in major seaports. Contact information for local union halls is found through national union Web sites.

Use the *Search for Employers by Industry* feature on the *Career Center* page at www.labormarketinfo.edd.ca.gov to locate employers in your area. Search under the following industry names to get a list of private firms and their addresses:

- Coastal/Great Lakes Freight Transport
- Coastal/Great Lakes Passenger Transport
- Deep Sea Freight Transportation

Search these **yellow page** headings for listings of private firms:

- Cruises
- Freight Forwarding
- Container Freight Service
- Yachts & Yacht Operation

Where Can the Job Lead?

Ship Engineers usually start out as a Third Assistant Engineer and may promote to a higher rank Engineering Officer with experience and additional training.

Related Occupations
Captains, Mates, and Pilots (see Logistics Profile)
Geological Sample Test Technicians
Mobile Heavy Equipment Mechanics, except Engines
Petroleum Pump System Operators
Petroleum Refinery and Control Panel Operators
Power Distributors and Dispatchers
Pump Operators, except Wellhead Pumpers
Railroad Inspectors (see Logistics Profile)
Soldering and Brazing Machine Setters and Set-Up Operators (see *Manufacturing Careers*)

Other Sources

California Maritime Academy (Cal Maritime)
www.csum.edu

Marine Engineers' Beneficial Association
www.d1meba.org

Military Sealift Command
www.msc.navy.mil

Pacific Maritime Association
www.pmanet.org

Paul Hall Center for Maritime Training and Education
www.seafarers.org/phc

Seafarers' International Union
www.seafarers.org

U.S. Coast Guard
www.uscg.mil/top/careers.asp

U.S. Coast Guard National Maritime Center
www.uscg.mil/hq/g-m/nmc/web

California Association of Regional Occupational Centers and Programs
www.carocp.org/carocps.html